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PRODUCTION OF BIOFUELS FROM MACROALGAE *Gracilaria* sp. AND *Codium fragile* - A PILOT STUDY

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Abstract

Macroalgae, commonly known as seaweeds found beneath the sea in the intertidal and subtidal regions are beneficial to humans as dietary supplements. They obtain nutrients for their growth and survival from seawater. In India seaweeds remain unexploited for research due to its maintenance at the laboratory. They possess high value added products which are of industrial importance. Usually seaweeds were grown only in open tanks and were reported useful for biofuel production. Currently, Bioethanol is produced from lignocellulosic materials such as wood, agricultural starchy materials, derived from terrestrial plant sources. Some species of seaweeds have been reported for bioethanol production since they were found to possess cellulosic materials. The carbohydrate content of seaweeds is about 80%. In the present investigation an attempt was made to grow them at the laboratory in a highly alkaline medium with similar conditions at the sea for biofuel production from green and brown algae such as biodiesel and bioethanol. Here the marine brown algae *Gracilaria* sp which was commercially used for the production of alginates was used for bioethanol production by the pretreatment of the algal biomass. The yield of fermentable sugars obtained were 4.12 mg/ml. Sugars were allowed to ferment with *Saccharomyces cereviceae* for 7 days and the ethanol produced were analyzed by HPLC. Marine green algae *Codium fragile* with lipid contents of 20-30% was selected with a potential for producing biodiesel. The oil from algae was extracted with chloroform and methanol in the ratio 1:1. The extracted oil was analyzed by GC-MS. In order to increase the lipid contents, nitrogen stress induction studies were carried out with one tank maintained as control. The macro algal medium devoid of nitrogen sources were added on daily basis and the growth was observed for 15 days in another tank. The samples were then dried and ground to powder form, extracted for oil and analyzed using GC-MS. Transesterification studies were done to obtain biodiesel.

Keywords: Seaweeds; lab scale cultivation; bioethanol; biodiesel